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<p>(54) Title: <b>BIRD DETERRENT</b></p> <div style="text-align: center; margin: 20px 0;"> </div> <p>(57) Abstract</p> <p>A device for deterring birds from perching on a broad surfaced structure such as a boat or building, wherein electrically pulsed conductors are applied to the surface in a widely-spaced pattern of lines which will enable a bird to walk between adjacent lines but which are crossed in the bird's passage to an edge of the surface. The electric pulse is of a quality harmless to the bird but sufficient to alarm it.</p>		

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"BIRD DETERRENT"

The present invention relates to bird deterrent means. In particular, the invention is directed to a device for deterring birds from perching or roosting on moored boats, the coping and cornices of buildings, railings and the like.

BACKGROUND ART

Owners of moored boats have long recognised, and suffered, the problem of birds perching on the boats. Not only do the birds leave feathers and excrement behind, but they also pose a health risk since they can introduce lice on to the boat. Many measures have been taken to deter birds from perching on boats. Such measures include wooden cut-outs painted as fierce blackhawks hung from shrouds, brightly coloured webbing and netting hung over the boat, brightly coloured streamers strung along the boat, tape recordings of the cry of the feared kittyhawk, and even a dead seagull hung upside down from the boom. While such measures may be of some effect initially, their deterrent value diminishes after a relatively short time as the birds become accustomed to the devices employed. For example, seagulls have been observed sheltering from the wind behind cut-outs of blackhawks, and perched on lines of streamers. Furthermore, such deterrents are either costly or of inconvenience to the boat owner.

In developing a solution to this problem the perching habits of birds have been studied. It has been observed that in the case of some species a preference is shown for perching upon a railing, while in other instances, especially in the case of seagulls which are perhaps the most troublesome birds to boat owners, the bird will alight upon the deck, roof, or other flat surface and immediately walk to the gunwale for a view of the water. A solution to the problem has taken into account these perching characteristics.

It is an object of the present invention to provide a means for alleviating the problem to boat owners and others caused by the undisturbed perching, or roosting, of birds.



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DISCLOSURE OF INVENTION

According to the present invention, there is disclosed a device for deterring birds from perching, or roosting, on a moored boat, a building or other structure having a broad surface attracting birds for perching, said device  
5 comprising electrical circuit means for generating a pulsed electrical voltage at an output, and electrical conduction means supported upon said surface and connected to said output to form electrically charged regions, said regions  
10 being arranged in lines in a spread-out pattern with said lines so widely spaced and located to permit movement of a bird between said lines but requiring to be crossed by the bird in its passage to an edge of the surface.

Preferably, the conduction means are flat metal  
15 ribbons which are laid in parallel pairs closely-spaced along the surface of the boat, or structure, so that when a bird's foot bridges the conductors, it will receive an electric shock from the voltage pulses. In the case of a boat such an arrangement is adequate if the craft is  
20 composed of timber, or fibre glass.

Alternatively, in the case of a metal hull, a single conductor can be laid over the boat insulated therefrom by a thin ribbon insulator, the other terminal of the output of the electrical circuit means being connected to the boat  
25 body. Thus, when a bird provides an electrical path between the conductor and the boat body, it will receive an electric shock.

Typically, the electrical circuit means provides a high voltage/low current pulse output which shocks the bird,  
30 but does not harm it. The shock is a sufficient deterrent to frighten the bird from the boat and, unlike other known deterrents, birds do not become accustomed to such electrical shocks.

If it be found that birds are perching only on a particular portion of the boat, e.g. the metal bow railing, a conductor insulated from the rail need only be arranged on  
35 the upper portion of the rail and the other terminal of the output of the electrical circuit means connected directly to the rail.



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It will be seen that the present invention utilizes the principle of electric fences which are used to restrict cattle within a certain area. However, such known electric fences cannot be applied directly to boats, or the other structures referred to above since the voltages used are not suitable and the arrangement of the conductors and their insulation from fence posts are inapplicable to boats. In the case of an electrical fence the earth is one terminal of the applied power.

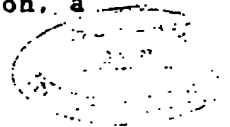
The pattern of the electrical charged regions is broad, i.e. quite widely spaced in the order of at least 300 mm. Narrow spacing might at first be considered necessary to ensure that an alighting bird does not avoid contact with the regions. Such close spacing of the electrical conductors would detract from the appearance of a boat as well as add considerably to the cost. However, as mentioned previously the perching habit of many of the troublesome birds which entail early movement of the bird towards the gunwale enables the pattern of the lines of conductors to be widely spread and therefore intercept the movement of the bird shortly after alighting.

In the present invention, the conduction means is preferably constructed as flat ribbon which can be adhered to the horizontal surfaces of the hull and cabin of the boat but is insulated from the surface by a thin insulating layer provided with a pressure-sensitive adhesive. Electrical conductor strips are exposed on the topside of the ribbon for contact with the bird. In this manner, the conductors need only be laid on those portions from which the birds are to be deterred, and the high voltage pulses do not interfere with other electronic equipment on board the boat. The same ribbon may be used on the topside of rigging.

Where it is intended to deter birds from perching on metal railing, the ribbon applied on the topside of the metal rail requires only a single electrical conductor with the opposite terminal of the electrical circuit means connected directly to the metal rail.

#### BRIEF DESCRIPTION OF DRAWINGS

Notwithstanding any other form of the invention, a



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preferred embodiment thereof will now be described with reference to drawings in which:

Fig. 1 is a partial diagrammatic representation of a marine launch to which the bird deterrent device according to the invention has been applied;

Fig. 2 is a perspective of an electrical control for said device; and,

Fig. 3 is a circuit diagram of the electrical voltage pulser.

BEST MODE OF CARRYING OUT THE INVENTION

As shown in Figs. 2 and 3, the control 10 for the bird deterrent device includes an electrical circuit (Fig. 3) in a housing 11 which can be affixed in the cockpit 12 of the boat 13 (Fig. 1). The input of the control 10 is connected to a D.C. voltage supply, typically a 12 volt battery, by leads 14. A pulsed output voltage is provided at the output terminals 15 of the control 10. The amplitude of the voltage pulses can be controlled by switch 16 and the frequency of the pulses can be varied by a control 17. A light emitting diode 18 can also be provided to indicate the impulse timing.

A pair of conductors 19 and 20 are connected to respective output terminals 15 of the control 10. The conductors 19 and 20 are flat metal ribbon conductors with an adhesive coating on their underside so that they can be affixed to a broad surface of the boat such as the deck 21 from which the birds are to be deterred from perching. Preferably, the conductors 19 and 20 are spaced about 15 mm apart and also include a thin underside electrically insulating layer which insulates the live conductor from the boat deck 21. The pair of conductors 19,20 are laid parallel and closely spaced so that a bird's foot can span both conductors 19,20. A bird thereby provides a conductive path between the conductors 19,20 and will receive an electric shock from the next voltage pulse produced by the control 10. Both conductors 19 and 20 may be carried upon a common insulating layer.

Alternatively, the ribbon may carry a single electrical conductor, say conductor 19, upon the insulating



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layer with the output terminals 15 connected respectively to the conductor 19 and the metal railing 22 of the boat, or to the deck 21 if composed of metal. Although in most instances the ribbon of conductors 19 and 20, or conductor 19 alone, will be permanently attached to the deck 21, it may be instead affixed upon a plastics sheeting which can be laid out and recovered as desired. Also whether conductors 19 and 20 are supported directly upon the deck 21 or the plastics sheeting, at least one of the conductors 19, 20 may be supported in a raised (or shielded) position to minimise any shorting effect which might be created by the presence of dew or rain. Furthermore, connection from the output terminals 15 of the control 10 to the conductors 19 and 20 is via clamps or even a stud fastener (not shown), while each conductor 19 and 20 may be a flexible metal braid, of the type known as "Monel" mesh sewn to the insulating layer, or may be a metallised plastics tape.

The electrical circuit for the control 10 is shown in Fig. 3. The circuit is powered from a voltage supply which may be from 9V to 28V DC. A voltage regulator LM 317T is connected to the voltage supply so as to provide a steady voltage power supply to the circuit. Diode D1 is used as a protection diode and capacitor C1 as a filter capacitor. Resistors R5 and R6 adjust the output voltage of the regulator to approximately 8V.

Oscillations produced in the windings W1 and W2 of transformer T1, using ancillary network Q2, resistors R7 and R8 and capacitors C2 and C4 cause approximately 120 volts to appear across the winding W3. This voltage is fed to a half-way rectifier D2 which in turn charges a 0.47 uf metallized polyester capacitor C5 which is connected in series with the primary winding W1 of coil T2 which has approximately 200 turns. This charge of the capacitor 35 produces approximately 2KV in the secondary winding W2 which has approximately 5000 turns.

A 2N 6027 programable unijunction transistor (PUT) Q1 initiates a discharge cycle by supplying a brief pulse to the gate G of the SCR. This causes the SCR to turn on, discharging the capacitor C5 through the coil W1. The SCR

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will remain on until the discharge current falls below its "hold on" current. The rate at which the PUT transistor supplies trigger pulses to the SCR depends on two factors, viz. a reference voltage set on its own gate by the ratio of resistors R2 and R3, and the time constant of resistor R4 and capacitor C3. When capacitor C3, and hence the anode A of transistor Q1, reach a voltage of 0.6V higher than the reference voltage, the device switches on. This allows the capacitor 3C to discharge into the gate G of the SCR thereby supplying a trigger pulse. The neon fires at approximately 90V through resistor R10 and is used as an indicator. The pulse produced with a 50 ohm load, approximately once every second, will have a voltage of 2KV at 250mA.

The circuit imposes only a small drain on the voltage supply, typically 25mA into a 500 ohm load at 2KV. Accordingly, battery life will not be a problem. Furthermore, when a high voltage shock is imparted to a bird, only a negligible amount of current, and hence power is used. The device can be activated merely by a flick of a switch and will not interfere with normal sailing or motoring activities.

The foregoing describes only one embodiment of the present invention and modifications which are obvious to those skilled in the art may be made thereto without departing from the scope of the invention.

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CLAIMS

1. A device for deterring birds from perching, or roosting, on a moored boat, a building or other structure having a broad surface attracting birds for perching, said device comprising electrical circuit means for generating a pulsed electrical voltage at an output, and electrical conduction means supported upon said surface and connected to said output to form electrically charged regions, said regions being arranged in lines in a spread-out pattern with said lines so widely spaced and located to permit movement of a bird between said lines but requiring to be crossed by the bird in its passage to an edge of the surface.

2. A device according to claim 1, wherein said electrical conduction means comprises a pair of electrical conduction leads fixedly mounted upon an electrically insulating layer located upon said surface.

3. A device according to claim 2, wherein said insulating layer is a strip coated on its underside with a pressure-sensitive adhesive for fixing to said surface

4. A device according to claim 2 or 3, wherein said pair of conduction leads are parallel lengths of flexible metal braid sewn onto said insulating layer.

5. A device according to claim 2 or 3, wherein said pair of conduction leads are parallel strips of metallized plastics tape.

6. A device according to any one of the preceding claims, wherein said spacing between adjacent lines of said electrically charged regions is at least 300 mm.

7. A device according to any one of the preceding claims, wherein to provide bird deterrents on rigging and railings of said boat said electrical conduction means is applied on the topside thereof.

8. A device according to any one of the preceding claims, wherein said electrical circuit means comprises a step-up transformer including a transistorised ancillary network associated with its primary winding whereby applied low voltage induces a voltage above 1KV in its secondary winding, and a storage capacitor receiving a charge from said secondary winding and being discharged to said output



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by firing of an SCR.

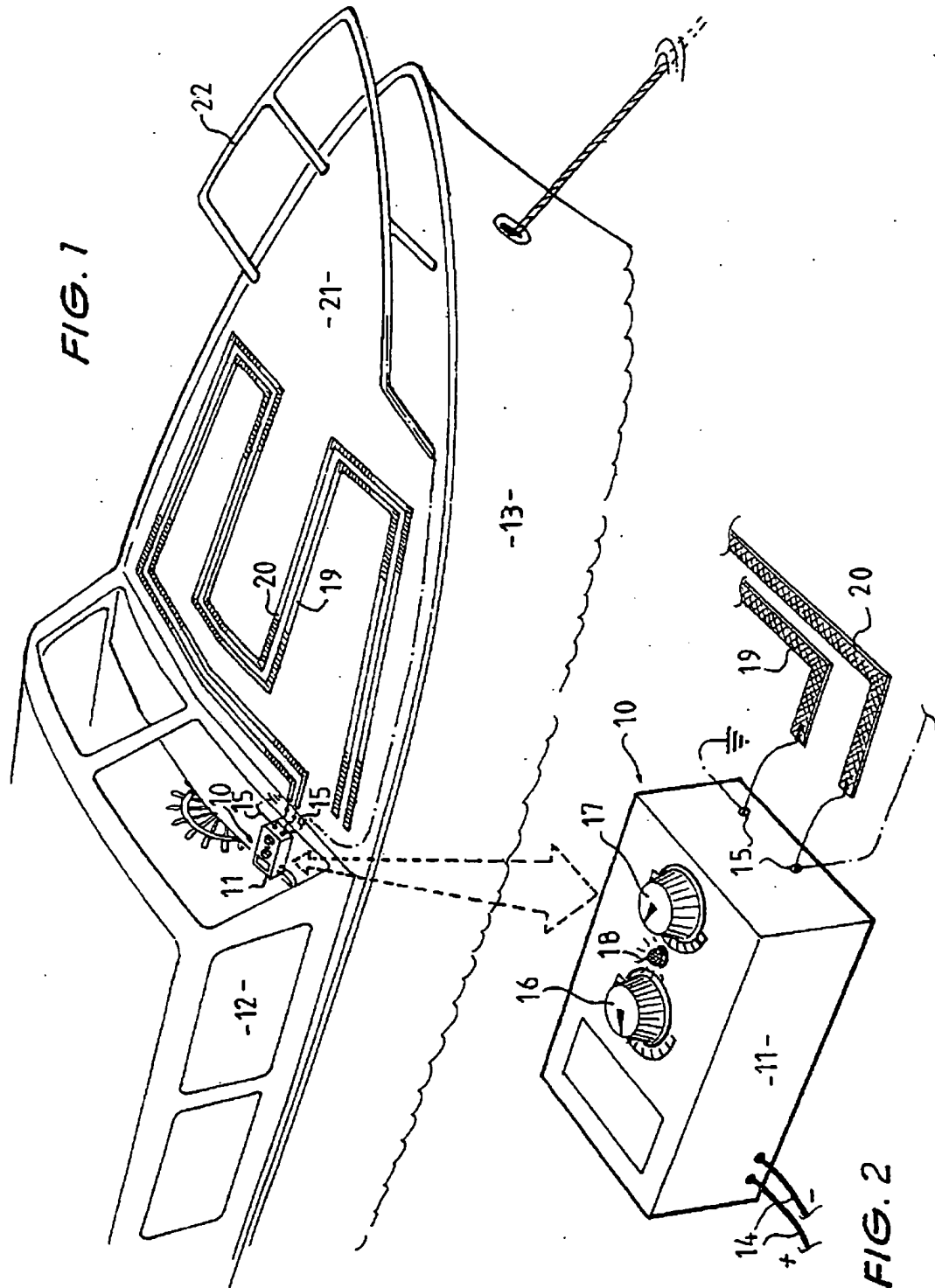
9. A device according to claim 8, wherein firing of said SCR is controlled by a timing circuit including a unijunction transistor.

10. A device for deterring birds substantially as hereinbefore described with reference to the accompanying drawings.



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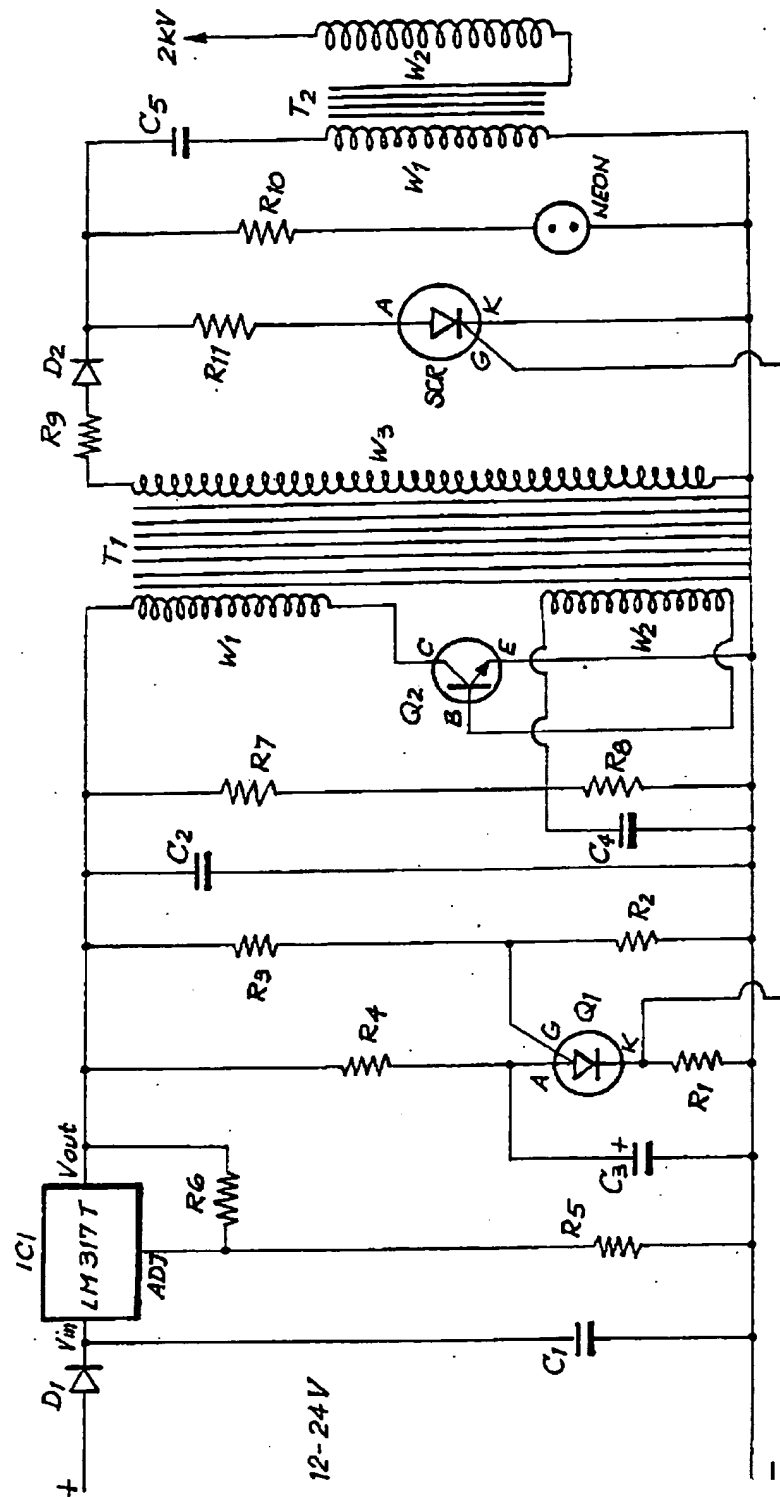


FIG. 3

## INTERNATIONAL SEARCH REPORT

International Application No PCT/AU84/00067

<b>I. CLASSIFICATION OF SUBJECT MATTER</b> (If several classification symbols apply, indicate all *)		
According to International Patent Classification (IPC) or to both National Classification and IPC		
Int. Cl. <sup>3</sup> A01M 29/00		
<b>II. FIELDS SEARCHED</b>		
Minimum Documentation Searched *		
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Documentation Searched other than Minimum Documentation to the extent that such Documents are included in the Fields Searched *		
AU: IPC as above		
<b>III. DOCUMENTS CONSIDERED TO BE RELEVANT</b> **		
Category *	Citation of Document, <sup>10</sup> with indication, where appropriate, of the relevant passages <sup>11</sup>	Relevant to Claim No. <sup>12</sup>
X	GB, A, 1074622 (BRAMLEY) 5 July 1967 (05.07.67)	
X	US, A, 336854 (ROBINSON) 30 January 1968 (30.01.68)	
X	US, A, 2647228 (JUST) 28 July 1953 (28.07.53)	
X	DE, C, 1051560 (EMRMARDT) 26 February 1959 (26.02.59)	
X	DE, C, 816622 (NISSEN) 16 August 1951 (16.08.51)	
X	GB, A, 357137 (WEY) 31 December 1974 (31.12.74)	
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<b>IV. CERTIFICATION</b>		
Date of the Actual Completion of the International Search *	Date of Mailing of this International Search Report *	
18 June 1984 (18.06.84)	20 JUNE 1984	
International Searching Authority *	Signature of Authorized Officer <sup>14</sup>	
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